

Association between Body Mass Index, Age and Blood Pressure among Reproductive Age Undernourished Women Dwelling in Prayagraj District

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DOI: <https://doi.org/10.52403/ijhsr.20220347>

ABSTRACT

Body Mass Index is a significant health indicator to assessment of undernutrition, over nutrition, obese. According to WHO normal BMI in a healthy person is 18.5- 24.4 kg/m² below 18.4 kg/m² considered as underweight, it is global as well serious health concern problem in Asia and African country. And above 24.4 kg/m² considered as overweight/obess also it is major health risk. Blood pressure is also health indicator parameter.

Objectives- To study the BMI and blood pressure Diastolic blood pressure and systolic blood pressure (according to American Heart Association) in undernourished reproductive age women in Prayagraj (Soran and Mauaima block).

Research design- cross sectional study was conducted in this study.

Methodology- A total no of 310 of female respondents selected in study, conducted January 2019 to December 2020 in Soraon and Mauaima block in Prayagraj Uttar Pradesh. According to respondents weight and height, recorded their BMI to assessment undernutrition in female respondents according to WHO parameter of BMI and recorded DBP and SBP by digital blood pressure monitor. Mean SD, Chi square, was used in statistics.

Result- according to their BMI Scale about 55.8% of the study subject were prone (Table no-1) to severely thinness, 29.7% was moderate whereas only 14.5% was found as mild thinness.

In case of their Blood Pressure, SBP mean value 1098.98 ± 15.27 and DBP 73.81 ± 10.72

Discussion- in this study positive correlation age and blood pressure whereas negative correlation found to be age and BMI and WHR

Keywords- BMI, Undernutrition, Blood pressure, Systolic Blood Pressure, Diastolic Blood Pressure, Weight, Height

INTRODUCTION

Assessment of nutritional status is one of the most significant derivations of public health strategy to combat malnutrition in form of undernutrition, over nutrition obese and resulting diet related non communicable disease in all manner, BMI is one of them anthropometric important health risk indicator to assess and combat

malnutrition. More than half of the female anemic according to NFHS data. Undernutrition is categorized according to presumptive diagnosis i.e. chronic energy deficiency- grade III considered as severe thinness (BMI<16.0), chronic energy deficiency grade II moderate thinness (16.0-17.0), Chronic energy deficiency grade I (17.0-18.5). According to this data the

individual has BMI with <16.0 – 18.5) more prone to undernutrition

In case of their SBP 76.1% of the study subject were SBP range of 90-120, 14.5% (121-139), 4.5% (140-159) 3.9 % (<90), 1.0% (160-170) found in given table.

METHODOLOGY

In this study total no of 310 of the female undernourished reproductive age (15-49) respondents selected from Prayagraj district in Uttar Pradesh in two block name Soraon and Mauaima. This study is based on cross sectional study. Ethical approval was taken for ethical committee from Institute of Medical Science Banaras Hindu University. According to Anthropometric measurement height, weight, Waist Hip Ratio, in Physiological dimensions Blood pressure recorded by respondents with digital blood pressure machine with standard protocols was kept in mind, three times BP was recorded for more validity. Weight and height were also recorded. Weight was taken with Virgo weighing scale recorded 3 times to each respondent with minimum clothing to the nearest 0.5 gm. Height was measured by standard scale to the nearest 0.5 cm. BMI was computed as $\text{weight(kg)/height(m}^2\text{)}$ the data was analysis by SPSS version 16 software, mean SD, Chi square test used in this study.

RESULT

Anthropometric measurement

Table no 2.1 Distribution of respondents on the basis of their status of weight, height and BMI and waist hip ratio

Weight	No.	Percentage
30 – 34.9	39	12.6
35 – 35.9	185	59.7
40 – 44.9	86	27.7
Total	310	100.0
Mean weight \pm SD = 37.47 \pm 3.26, Range = (30-44)		

Table 2.1 demonstrated that weight of the respondents between 35-35.9 was 59.7%, 27.7% weight was showed 40-44.9 and only 12.6% of the study subjects were 30-34.9. Mean weight was 37.47 ± 3.26 (weight 30-44).

Height (cm)

< 153	75	24.2
153 – 156	173	55.8
> 156	62	20.0
Mean height \pm SD 154.54 \pm 2.20, Range = (145-165)		

Similarly, it was represented that 55.8% rural women were height between 153-156 cm. 24.2% were height <153 and only 20.0% were height >156 and their Mean height \pm SD 154.54 \pm 2.20.

According to their height half of the respondents about 55.8% between age of < 153 and 24.2% and 20.0% and their height between 153- 156 and > 156 respectively.

BMI

Mild	45	14.5
Moderate	92	29.7
Severe	173	55.8
Mean BMI \pm SD = 15.68 \pm 1.25, Range = (12.49- 18.40)		

WHR

< 0.75	154	49.7
0.75 – 0.80	115	37.1
>0.80	41	13.2
Mean WHR \pm SD = 0.75 \pm 0.05, Range = (0.62- 0.99)		

In the above table depicted that the highest mean weight SD was recorded among the respondents in the age group 30-40 years 37.47 ± 3.26 with regard of height highest mean height SD was recorded among study subjects in the height 145-165 height 154.54 ± 2.20 . according to their BMI it was recorded highest mean BMI SD was recorded 15.68 ± 1.25 and highest Mean WHR was recorded SD = 0.75 ± 0.05 in the study subjects respectively.

Table no 2.2 Age wise distribution of respondents according to their weight height, BMI, and WHR

Weight	Age							
	<25		25-34		35-45		Total	
	No.	Percentage	No	Percentage	No.	Percentage	No.	Percentage
30-34.9	21	13.3	10	11.5	8	12.3	39	12.6
35-39.9	96	60.8	55	63.2	34	52.3	185	59.7
40-49.9	41	25.9	22	25.3	23	35.4	86	27.7
Total	158	100.0	87	100.0	65	100.0	310	100.0
Mean \pm SD	37.47 \pm 3.12		37.29 \pm 3.14		37.72 \pm 3.74		37.47 \pm 3.26	
F = 0.33, P>0.05								

Table no 2.2 shows that it was clear that with increasing of age increment in weight also and the mean age value is 37.47 ± 3.12 37.29 ± 3.14 and 37.72 ± 3.74 with the age of <25, 25-34 and 35-45 respectively. But this difference was found highly insignificant.

Height								
<153	36	22.8	12	13.8	27	41.5	75	24.2
153-156	89	56.3	55	63.2	29	44.6	173	55.8
>156	33	20.9	20	23.0	9	13.8	62	20.0
Mean \pm SD	154.69 ± 2.28		154.83 ± 2.47		153.77 ± 2.47		154.4 ± 2.40	
F = 4.37, P<0.05, Significant pairs (1 Vs 2,3)								

In case of their height, it was observed maximum age i.e., mean SD 154.69 ± 2.28 , 154.83 ± 2.47 and 153.77 ± 2.47 in the similar age found in weight and difference was found statistically significant.

BMI								
Mild	21	13.3	9	10.3	15	23.1	45	14.5
Moderate	45	28.5	25	28.7	22	33.8	92	29.7
Severe	92	58.2	53	61.0	28	43.1	173	55.8
Mean \pm SD	15.65 ± 1.20		15.55 ± 1.18		15.94 ± 1.41		15.68 ± 1.25	
F = 1.97, P> 0.05								

It was emphasized from the above table that Mean SD i.e., 15.65 ± 1.20 , 15.55 ± 1.18 and 15.94 ± 1.41 in the age of <25, 25-34, and 35-45 and difference was found statistically insignificant.

WHR								
<0.75	74	46.8	47	54.0	33	50.8	154	49.7
0.75 – 0.80	58	36.7	32	36.8	25	38.5	115	37.1
>0.80	26	16.5	8	9.2	7	10.7	41	13.2
Mean SD	0.754 ± 0.49		0.750 ± 0.049		0.747 ± 0.046		0.751 ± 0.048	
F = 0.52, P>0.05								

In case of WHR Mean SD was 0.754 ± 0.49 , 0.750 ± 0.049 and 0.747 ± 0.046 in same age of above table and difference was found statistically insignificant.

Blood pressure

Table no 3.1 Distribution of respondents as per their Systolic and Diastolic Blood Pressure

Systolic BP			Diastolic BP		
	No.	Percentage		No.	Percentage
< 90	12	3.9	< 60	17	5.5
90 – 120	236	76.1	60 – 80	215	69.4
121 – 139	45	14.5	81- 89	52	16.8
140 -159	14	4.5	90 - 99	21	6.7
160 – 179	03	1.0	100 - 109	5	1.6
\geq 180	-	-	\geq 110	-	-
E					
Total	310	100.0	Total	310	100.0
Mean \pm SD	109.98 ± 15.27		Mean \pm SD	73.81 ± 10.77	
Range	(85 - 179)		Range	(47 - 109)	

From the above table observed that majority of the respondents i.e., 76.1% and 69.4% were SBP and DBP i.e., 90 – 120 mmHg respectively. Only 1% and 1.6% respondents were SPB and DBP were 160-

170 mmHg respectively suffered from high blood pressure. Whereas average SBP and DBP was 109.98 ± 15.27 and 73.81 ± 10.77 mm Hg among of the study subjects.

Distribution of systolic BP of respondents on the basis of their age, BMI and WHR

Age	SBP							
	≤ 120		121 - 139		140 and above		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
< 25	135	85.4	17	10.8	6	3.8	158	100.0
25 – 34	70	80.5	13	14.9	4	4.6	87	100.0
Total	248	80.0	45	14.5	17	5.5	310	100.0
X ² = 11.23, df = 4, P < 0.05								

It was reported from the above table that maximum percent of respondent in the age group less than 25 and 25 – 34 i.e., 85.4% and 80.5% had SBP less than 120

mm Hg their SBP between 120 - 139 mm and statistically difference was found statistically significant.

BMI									
Mild	37	82.2	7	15.6	1	2.2	45	100.0	
Moderate	70	76.1	19	20.6	3	3.3	92	100.0	
Severe	141	81.5	19	11.0	13	7.5	173	100.0	
X ² = 7.16, df = 4, P > 0.05									

Similarly, it was found from the table, that 82.2% of the respondents were having mild symptoms of undernutrition according to their BMI (Classification of WHO) while only 7.5% were having prone to severe condition of undernutrition.

WHR									
< 0.75	118	76.6	27	17.5	9	5.9	154	100.0	
0.75 – 0.80	98	45.2	11	9.6	6	5.2	115	100.0	
> 0.80	32	78.0	7	17.1	2	4.9	41	100.0	
X ² = 3.80, df = 4, P > 0.05									

According to WHR 76.6% of the respondents were having <0.75 WHR and only 4.9% were having WHR >0.80 and

Table no 3.2 Distribution of Diastolic blood pressure of respondents on the basis of their age, BMI, and WHR

Age	DBP							
	< 80		81 - 89		90 and above		Total	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
< 25	124	78.5	26	16.5	8	5.0	158	100.0
25 – 34	66	75.9	11	12.6	10	11.5	87	100.0
35 – 45	42	64.6	15	23.1	8	12.3	65	100.0
Total	232	74.8	52	16.8	26	8.4	310	100.0
X ² = 12.91, df = 4, P < 0.05								

Accordingly to above table 78.5% of the respondents <25 remain 16.5% and 5.0% was having DBP <80, 81-89, and 90 and above. Similarly 75.9%, 12.6%, and 11.5% age of 25- 34 was having DBP <80, 81-89, and 90. Furthermore, 64.6%, 23.1%,

and 12.3% was of the respondents was having DBP <80, 81-89, and 90 it was also observed from the table significantly that relationship between age and DBP was found insignificant.

BMI									
Mild	28	62.2	11	24.4	6	13.4	45	100.0	
Moderate	71	77.7	14	15.2	7	7.6	92	100.0	
Severe	133	76.9	27	15.6	13	7.5	173	100.0	
X ² = 4.51, df = 4, P > 0.05									

In addition, according to their BMI 77.7% was moderate BMI according to WHO and only 7.5% was severe BMI and their relationship was found significant.

WHR									
0.75	115	74.7	29	18.8	10	6.5	154	100.0	
0.75 – 0.80	84	73.0	20	17.4	11	9.6	115	100.0	
> 0.80	33	80.5	3	7.3	5	12.2	41	100.0	
X ² = 4.38, df = 4, P > 0.05									

Together with their WHR 74.7% 18.8% and 6.5% was 0.75 with DBP of <80, 81-89, and 90. 73.0%, 17.4% and 9.6% was having WHR 0.75-0.80 with DBP <80, 81-89, and 90 along with 80.5%, 12.2, and 7.3% was having DBP <80, 90 and 81-89 and statistical relationship was found statistically significant.

DISCUSSION

Undernutrition is a public health crisis, and it is found that condition is more prevalent among rural reproductive age women. In this present study according their age, relationship between age and weight BMI and WHR was found to be not significant while in case of Height was observed as statistically significant. Similarly in case of Blood pressure both SBP and DBP. The relationship between age and SBP was found to be significant whereas BMI, WHR, was found to be significant along with DBP with age as found statistically significant while BMI WHR was found to be insignificant.

CONCLUSION

In this study we found that blood pressure (SBP and DBP) and age was found positive correlation and negative correlation between age and weight as well as BMI.

Acknowledgement: None

Conflict of Interest: None

Source of Funding: None

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How to cite this article: Verma N, Chakravorty A, Shankar R. Association between body mass index, age and blood pressure among reproductive age undernourished women dwelling in Prayagraj district. *Int J Health Sci Res.* 2022; 12(3): 363-367. DOI: <https://doi.org/10.52403/ijhsr.20220347>
